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ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

Integral Consulting Inc.
Suite 190
285 Century Place
Louisville CO 80027

Report Date: June 11, 2018 09:41

Project: Solvay

Account #: 20003
Group Number: 1946693
State of Sample Origin: NJ

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Electronic Copy To	Solvay	Attn: Mitch Gertz
Electronic Copy To	Solvay	Attn: Mark Christensen
Electronic Copy To	Integral Consulting Inc.	Attn: Erin Palko
Electronic Copy To	Integral Consulting Inc.	Attn: Craig Hutchings

Respectfully Submitted,

Lyssa M. Longenecker

Lyssa M. Longenecker
Specialist

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SAMPLE INFORMATION

Client Sample Description	Sample Collection Date/Time	ELLE#
V-915 Grab Water	05/22/2018 09:00	9623376
Field Blank Grab Water	05/22/2018 09:00	9623377

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Sample Description: **V-915 Grab Water**

Project Name: **Solvay**

Integral Consulting Inc.
ELLE Sample #: **WW 9623376**
ELLE Group #: **1946693**
Matrix: Water

Submittal Date/Time: 05/23/2018 10:05
Collection Date/Time: 05/22/2018 09:00

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1 Modified**		**ng/l**	**ng/l**	**ng/l**	
14473	Perfluorobutanesulfonate	375-73-5	N.D.	0.28	0.93	1
14473	Perfluorodecanoic acid	335-76-2	4.9	0.93	1.9	1
14473	Perfluorododecanoic acid	307-55-1	N.D.	0.28	0.93	1
14473	Perfluoroheptanoic acid	375-85-9	5.7	0.28	0.93	1
14473	Perfluorohexanesulfonate	355-46-4	1.2 J	0.37	1.9	1
14473	Perfluorohexanoic acid	307-24-4	3.6	0.37	1.9	1
14473	Perfluorononanoic acid	375-95-1	540	3.7	19	10
14473	Perfluoro-octanesulfonate	1763-23-1	4.3	0.37	1.9	1
14473	Perfluorooctanoic acid	335-67-1	75	0.28	0.93	1
14473	Perfluorotetradecanoic acid	376-06-7	N.D.	0.28	0.93	1
14473	Perfluorotridecanoic acid	72629-94-8	0.40 J	0.28	0.93	1
14473	Perfluoroundecanoic acid	2058-94-8	19	0.37	1.9	1

The sample injection standard areas and labeled compounds used as extraction standard areas were outside of the QC limits as noted on the QC Summary for both the initial injection and the re-injection. The values here are from the initial injection of the sample.

Sample Comments

State of New Jersey Lab Certification No. PA011

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	18152006	06/03/2018 17:56	Devon M Whooley	1
14473	PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	18152006	06/07/2018 06:59	Devon M Whooley	10
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	2	18152006	06/01/2018 07:20	Pamela Rothharpt	1

*=This limit was used in the evaluation of the final result

Sample Description: **Field Blank Grab Water**

Project Name: **Solvay**

Integral Consulting Inc.
ELLE Sample #: **WW 9623377**
ELLE Group #: **1946693**
Matrix: Water

Submittal Date/Time: 05/23/2018 10:05
Collection Date/Time: 05/22/2018 09:00

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1 Modified**		**ng/l**	**ng/l**	**ng/l**	
14473	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.90	1
14473	Perfluorodecanoic acid	335-76-2	N.D.	0.90	1.8	1
14473	Perfluorododecanoic acid	307-55-1	N.D.	0.27	0.90	1
14473	Perfluoroheptanoic acid	375-85-9	N.D.	0.27	0.90	1
14473	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	1.8	1
14473	Perfluorohexanoic acid	307-24-4	N.D.	0.36	1.8	1
14473	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.8	1
14473	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.36	1.8	1
14473	Perfluorooctanoic acid	335-67-1	N.D.	0.27	0.90	1
14473	Perfluorotetradecanoic acid	376-06-7	N.D.	0.27	0.90	1
14473	Perfluorotridecanoic acid	72629-94-8	N.D.	0.27	0.90	1
14473	Perfluoroundecanoic acid	2058-94-8	N.D.	0.36	1.8	1

The recovery for a target analyte(s) in the Laboratory Control Spike(s) is outside the QC acceptance limits as noted on the QC Summary. Since the recovery is high and the target analyte(s) was not detected in the sample, the data is reported.

Sample Comments

State of New Jersey Lab Certification No. PA011

All QC is compliant unless otherwise noted. Please refer to the Quality Control Summary for overall QC performance data and associated samples.

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14473	PFAS in Water by LC/MS/MS	EPA 537 Version 1.1 Modified	1	18145009	05/31/2018 07:16	Devon M Whooley	1
14091	PFAS Water Prep	EPA 537 Version 1.1 Modified	1	18145009	05/25/2018 15:30	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

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Quality Control Summary

Client Name: Integral Consulting Inc. Group Number: 1946693
Reported: 06/11/2018 09:41

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result	MDL**	LOQ
	ng/l	ng/l	ng/l
Batch number: 18145009	Sample number(s): 9623377		
Perfluorobutanesulfonate	N.D.	0.30	1.0
Perfluorodecanoic acid	N.D.	1.0	2.0
Perfluorododecanoic acid	N.D.	0.30	1.0
Perfluoroheptanoic acid	N.D.	0.30	1.0
Perfluorohexanesulfonate	N.D.	0.40	2.0
Perfluorohexanoic acid	N.D.	0.40	2.0
Perfluorononanoic acid	N.D.	0.40	2.0
Perfluoro-octanesulfonate	4.2	0.40	2.0
Perfluorooctanoic acid	N.D.	0.30	1.0
Perfluorotetradecanoic acid	N.D.	0.30	1.0
Perfluorotridecanoic acid	N.D.	0.30	1.0
Perfluoroundecanoic acid	N.D.	0.40	2.0
Batch number: 18152006	Sample number(s): 9623376		
Perfluorobutanesulfonate	N.D.	0.30	1.0
Perfluorodecanoic acid	N.D.	1.0	2.0
Perfluorododecanoic acid	N.D.	0.30	1.0
Perfluoroheptanoic acid	N.D.	0.30	1.0
Perfluorohexanesulfonate	N.D.	0.40	2.0
Perfluorohexanoic acid	N.D.	0.40	2.0
Perfluorononanoic acid	N.D.	0.40	2.0
Perfluoro-octanesulfonate	N.D.	0.40	2.0
Perfluorooctanoic acid	N.D.	0.30	1.0
Perfluorotetradecanoic acid	N.D.	0.30	1.0
Perfluorotridecanoic acid	N.D.	0.30	1.0
Perfluoroundecanoic acid	N.D.	0.40	2.0

LCS/LCSD

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18145009	Sample number(s): 9623377								
Perfluorobutanesulfonate	4.81	5.88	4.81	5.68	122	118	73-128	3	30
Perfluorodecanoic acid	5.44	6.91	5.44	6.87	127	126	69-148	1	30
Perfluorododecanoic acid	5.44	6.39	5.44	6.83	118	126	75-136	7	30

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: Integral Consulting Inc. Group Number: 1946693
Reported: 06/11/2018 09:41

LCS/LCSD (continued)

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Perfluoroheptanoic acid	5.44	7.02	5.44	7.06	129	130	76-140	1	30
Perfluorohexanesulfonate	5.14	5.95	5.14	5.71	116	111	71-131	4	30
Perfluorohexanoic acid	5.44	6.69	5.44	7.24	123	133	75-135	8	30
Perfluorononanoic acid	5.44	6.52	5.44	6.62	120	122	72-148	1	30
Perfluoro-octanesulfonate	5.20	6.62	5.20	9.45	127	182*	67-138	35*	30
Perfluorooctanoic acid	5.44	6.87	5.44	6.56	126	121	72-138	5	30
Perfluorotetradecanoic acid	5.44	6.88	5.44	6.84	126	126	74-135	1	30
Perfluorotridecanoic acid	5.44	6.03	5.44	6.69	111	123	61-145	10	30
Perfluoroundecanoic acid	5.44	6.86	5.44	6.78	126	125	75-146	1	30
Batch number: 18152006	Sample number(s): 9623376								
Perfluorobutanesulfonate	4.81	5.24	4.81	5.39	109	112	73-128	3	30
Perfluorodecanoic acid	5.44	5.63	5.44	5.45	103	100	69-148	3	30
Perfluorododecanoic acid	5.44	5.70	5.44	5.87	105	108	75-136	3	30
Perfluoroheptanoic acid	5.44	5.89	5.44	6.00	108	110	76-140	2	30
Perfluorohexanesulfonate	5.14	5.31	5.14	5.69	103	111	71-131	7	30
Perfluorohexanoic acid	5.44	5.60	5.44	5.92	103	109	75-135	6	30
Perfluorononanoic acid	5.44	6.09	5.44	5.94	112	109	72-148	2	30
Perfluoro-octanesulfonate	5.20	5.10	5.20	5.44	98	105	67-138	6	30
Perfluorooctanoic acid	5.44	6.42	5.44	6.30	118	116	72-138	2	30
Perfluorotetradecanoic acid	5.44	5.29	5.44	5.41	97	99	74-135	2	30
Perfluorotridecanoic acid	5.44	5.80	5.44	6.06	107	111	61-145	4	30
Perfluoroundecanoic acid	5.44	5.59	5.44	5.98	103	110	75-146	7	30

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Water by LC/MS/MS
Batch number: 18145009

	13C3-PFBS	13C5-PFHxA	13C3-PFHxS	13C4-PFHpA	13C8-PFOA	13C8-PFOS
9623377	81	80	81	80	84	87
Blank	81	86	79	87	82	82
LCS	79	87	81	84	85	87
LCSD	79	73	79	77	78	77
Limits:	26-148	31-128	34-126	35-126	43-112	43-115

	13C9-PFNA	13C6-PFDA	13C7-PFUnDA	13C2-PFDoDA	13C2-PFTeDA
9623377	93	79	89	88	81
Blank	88	82	97	90	80

*- Outside of specification
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P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Quality Control Summary

Client Name: Integral Consulting Inc. Group Number: 1946693
Reported: 06/11/2018 09:41

Surrogate Quality Control (continued)

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: PFAS in Water by LC/MS/MS
Batch number: 18145009

	13C9-PFNA	13C6-PFDA	13C7-PFUnDA	13C2-PFDoDA	13C2-PFTeDA
LCS	95	84	90	94	81
LCSD	86	76	82	80	75
Limits:	32-134	40-115	30-128	28-127	26-119

Analysis Name: PFAS in Water by LC/MS/MS
Batch number: 18152006

	13C3-PFBS	13C5-PFHxA	13C3-PFHxS	13C4-PFHpA	13C8-PFOA	13C8-PFOS
9623376	295*	103	155*	118	73	98
Blank	91	94	92	100	95	86
LCS	89	107	95	98	94	91
LCSD	85	94	85	92	92	82
Limits:	26-148	31-128	34-126	35-126	43-112	43-115

	13C9-PFNA	13C6-PFDA	13C7-PFUnDA	13C2-PFDoDA	13C2-PFTeDA
9623376	84	75	99	108	104
Blank	96	99	103	112	99
LCS	93	97	95	100	92
LCSD	89	88	85	89	87
Limits:	32-134	40-115	30-128	28-127	26-119

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.
P###### is indicative of a Background or Unspiked sample that is batch matrix QC and was not performed using a sample from this submission group.

Environmental Analysis Request/Chain of Custody

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Acct. # 20003 Group # 1946693 Sample # 962336-78

COC # 548841

Client Information

Client: Silvay	Acct. #:
Project Name/#:	PWSID #:
Project Manager: Gentz	P.O. #:
Sampler: Christensen	Quote #:
State where samples were collected: NJ	For Compliance: Yes ☒ No ☐

Sample Identification	Collected Date	Collected Time	Grab	Composite	Soil	Sediment	Tissue	Water	Potable	Ground	NPDES	Surface	Other:	Total # of Containers	PFAS LC/MS/MS
V-915	5/22/18	0900	X					X						2	
Field Blank	5/22/18	0900	X					X							

Turnaround Time (TAT) Requested (please circle)
Standard Rush
(Rush TAT is subject to laboratory approval and surcharge.)

Date results are needed: 6/20/18

E-mail address: mark.christensen@silvay.com

Data Package Options (circle if required)
Type I (EPA Level 3 Equivalent/non-CLP) Type VI (Raw Data Only)
Type III (Reduced non-CLP) NJ DKQP TX TRRP-13
NYSDEC Category A or B MA MCP CT RCP

Relinquished by	Date	Time	Received by	Date	Time
Bottle Storage	4-27-18	10:00	Bill DeEnv	4-27-18	10:00
Bill DeEnv	4-27-18			5/22/18	0800
	5/22/18	1500			
			Edrohen	5-23-18	1005

EDD Required? Yes No
If yes, format:
Site-Specific QC (MS/MSD/Dup)? Yes No
(If yes, indicate QC sample and submit triplicate sample volume.)

Relinquished by Commercial Carrier: UPS FedEx X Other
Temperature upon receipt 3.9 °C

For Lab Use Only
FSC:
SCR#: 224177

Preservation Codes
H=HCl T=Thiosulfate
N=HNO_3 B=NaOH
S=H_2SO_4 O=Other

Remarks

Analysis Requested
Preservation Codes

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Sample Administration Receipt Documentation Log

Doc Log ID: 217175

Group Number(s): 1946693

Client: Solvay

Delivery and Receipt Information

Delivery Method:	Fed Ex	Arrival Timestamp:	05/23/2018 10:05
Number of Packages:	1	Number of Projects:	1
State/Province of Origin:	NJ		

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	VOA Vial Headspace ≥ 6mm:	No
Samples Chilled:	Yes	Total Trip Blank Qty:	2
Paperwork Enclosed:	Yes	Trip Blank Type:	HCl
Samples Intact:	Yes	Air Quality Samples Present:	No
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Melvin Sanchez (8 943) at 14:51 on 05/23/2018

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperatures in °C.

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT131	3.9	DT	Wet	Y	Bagged	N

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Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	**mg**	milligram(s)
C	degrees Celsius	**mL**	milliliter(s)
cfu	colony forming units	**MPN**	Most Probable Number
CP Units	cobalt-chloroplatinate units	**N.D.**	non-detect
F	degrees Fahrenheit	**ng**	nanogram(s)
g	gram(s)	**NTU**	nephelometric turbidity units
IU	International Units	**pg/L**	picogram/liter
kg	kilogram(s)	**RL**	Reporting Limit
L	liter(s)	**TNTC**	Too Numerous To Count
lb.	pound(s)	**µg**	microgram(s)
m3	cubic meter(s)	**µL**	microliter(s)
meq	milliequivalents	**umhos/cm**	micromhos/cm

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

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Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.